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(54) **TELESCOPICALLY ADJUSTABLE PAIR OF SPECTACLES**

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G02C 5/22 (2006.01)

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CPC .. ***G02C 5/20*** (2013.01); ***G02C 5/10*** (2013.01); ***G02C 5/2263*** (2013.01); *G02C 2200/18* (2013.01)

(58) **Field of Classification Search**
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USPC 351/111, 113, 115, 117–119
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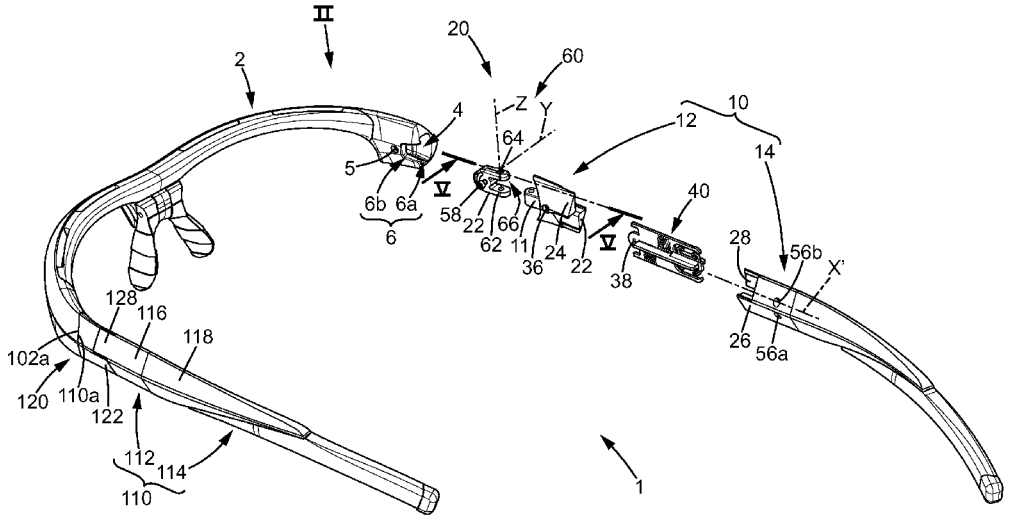
(57) **ABSTRACT**

The invention relates to a pair of spectacles, comprising a viewing portion and two side arms that are each connected to the viewing portion, each side arm including a first portion and a second portion sliding relative to one another in a sliding direction between a retracted position and an extended position, said pair of spectacles being characterized in that: the first portion includes a first pair of legs extending in the sliding direction; the second portion includes a second pair of legs extending in the sliding direction; and the first pair of legs and the second pair of legs are mutually engaged.

12 Claims, 4 Drawing Sheets



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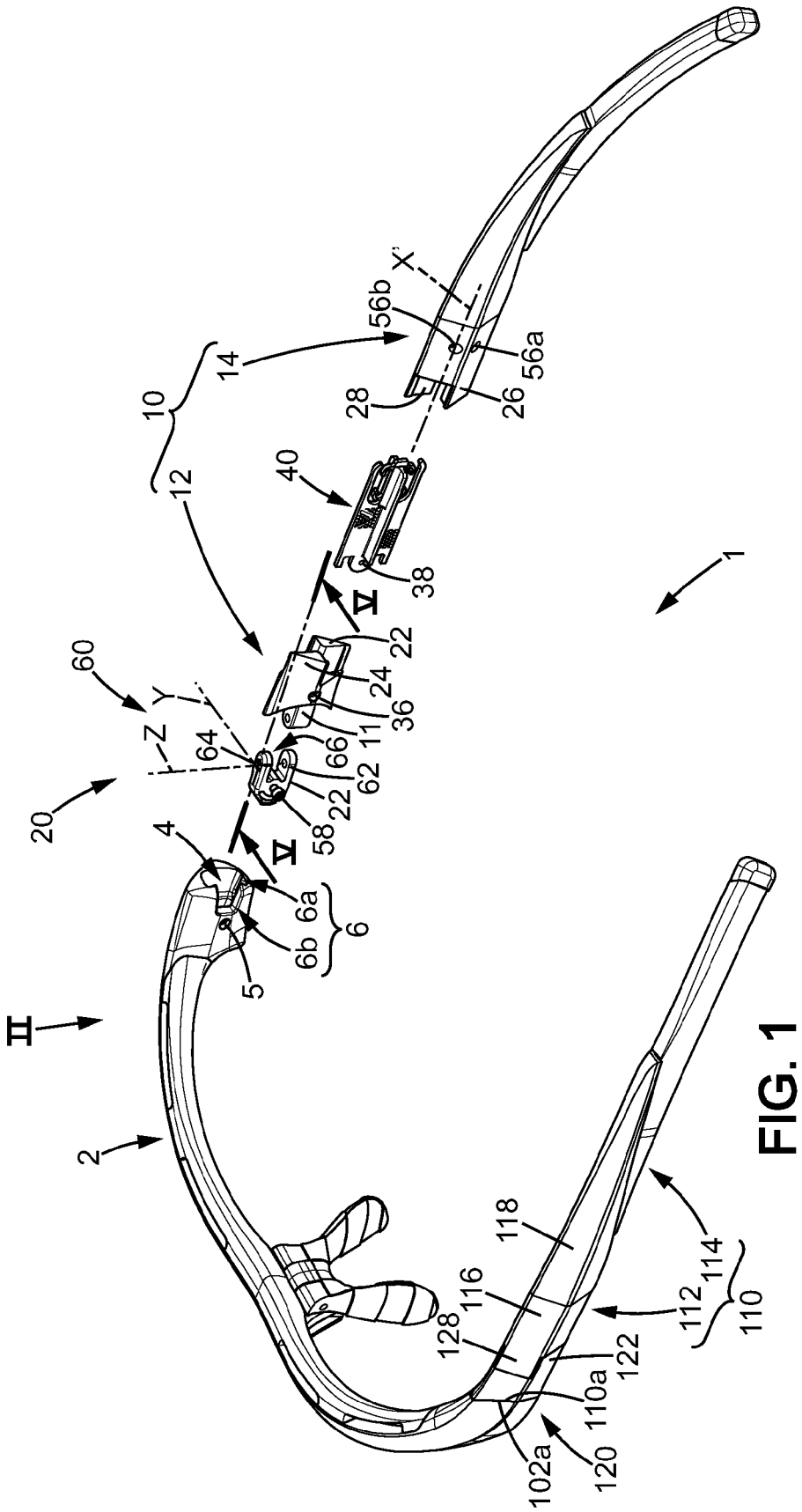
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58
60
62
64
66
X
Y
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II
IV
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110a
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114
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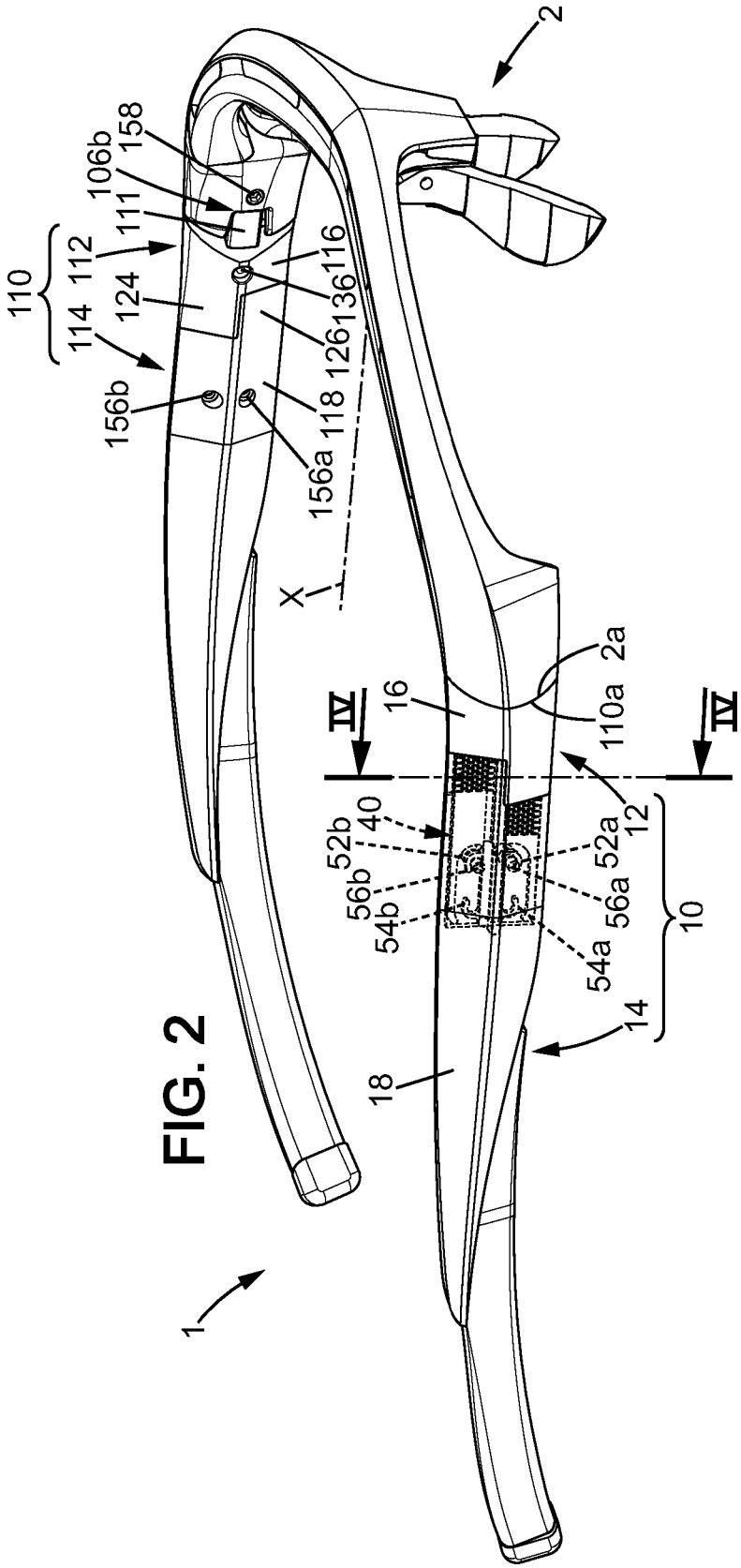
122
128
102a

FIG. 1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40
52b
52a
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56b
56a
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54a
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14
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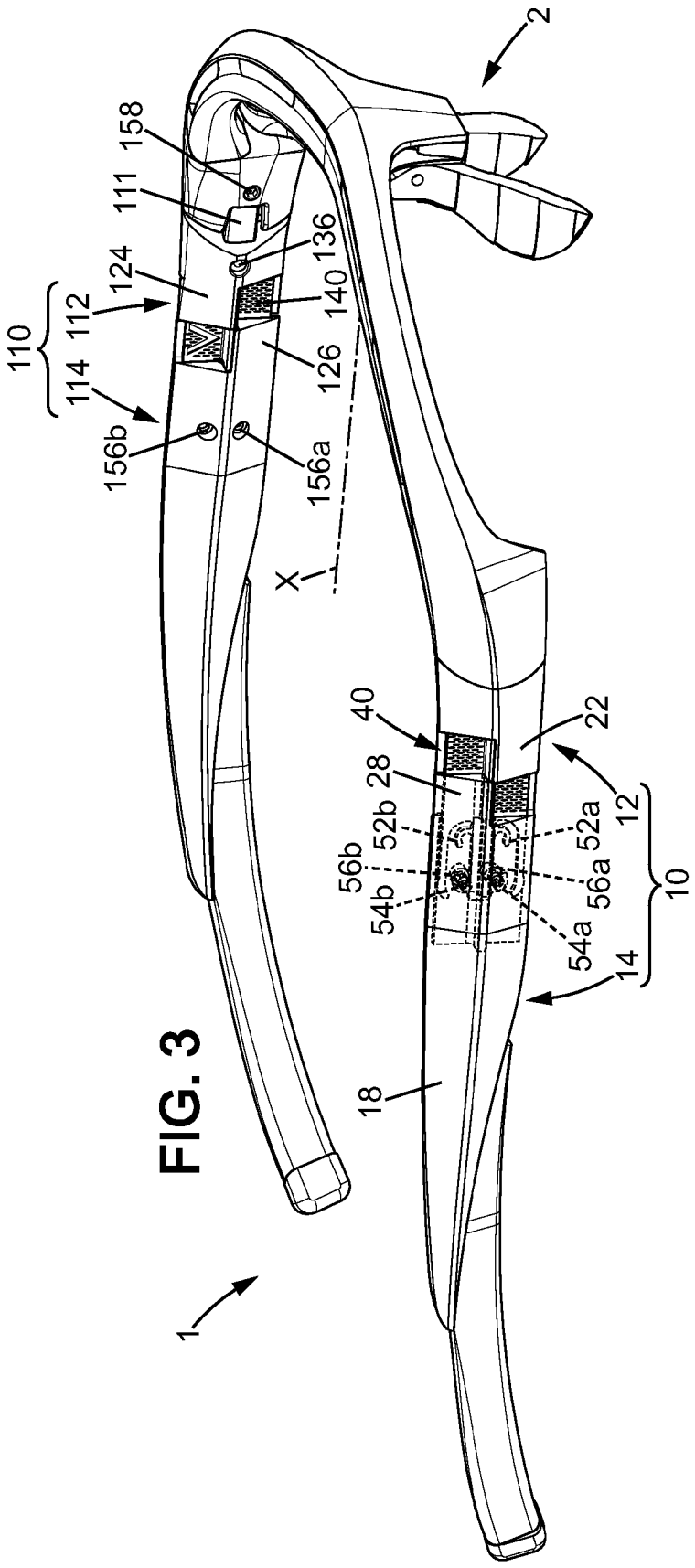
1

FIG. 2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156b
156a
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56b
56a
10
54b
54a
14
18
1

FIG. 3

FIG. 4

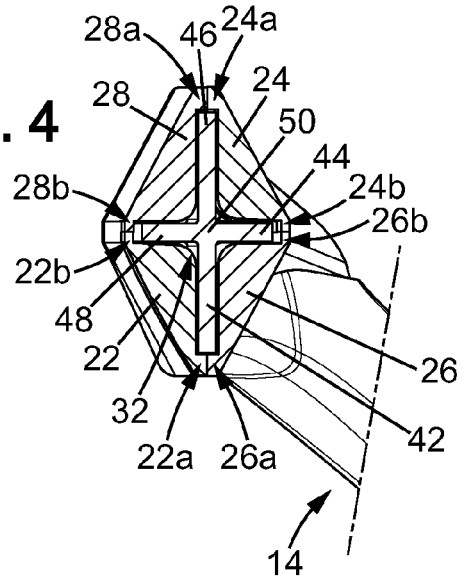


FIG. 5

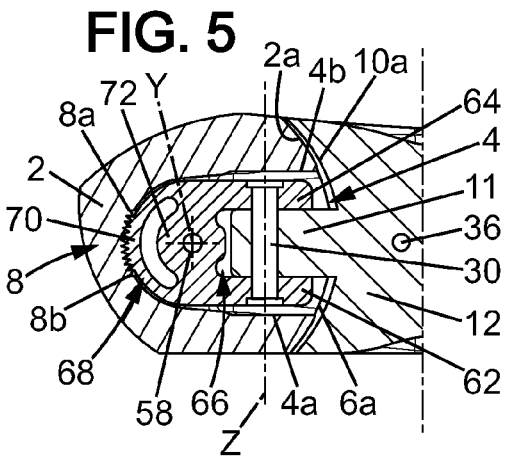


FIG. 6

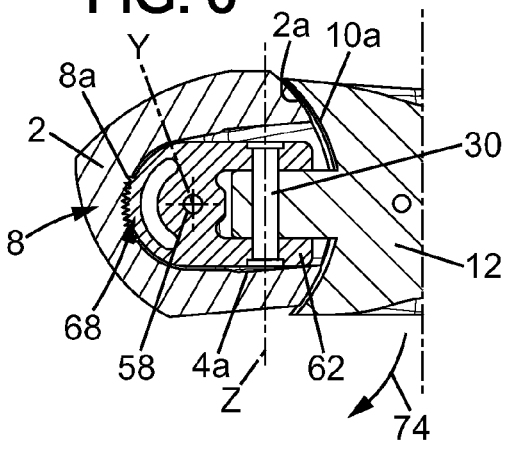
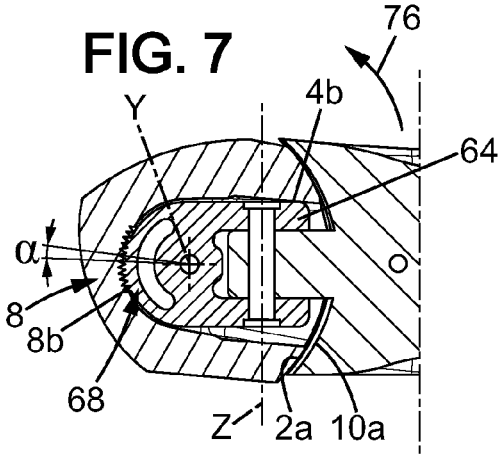


FIG. 7



TELESCOPICALLY ADJUSTABLE PAIR OF SPECTACLES

OBJECT OF THE INVENTION

The invention relates to a pair of spectacles comprising a viewing portion and two side arms that are each connected to the viewing portion in a manner that offers telescoping adjustment.

BACKGROUND OF THE INVENTION

In a well known manner, such an adjustment is intended to vary the length of the side arms in order to adjust to the physiological differences between the people who wear these spectacles. Such an adjustment can also serve to increase the retention of the spectacles on the face of a specific person during certain activities in order to prevent the spectacles from shifting their position on the face or falling off in extreme cases. The invention also relates to this particularly desirable alternative when wanting to participate in athletic activities, for example.

There is a known conventional pair of spectacles of this type in which each side arm comprises a first portion and a second portion that slide relative to one another in a sliding direction, between a retracted position and an extended position.

SUMMARY OF THE INVENTION

The invention aims to propose a simple, robust, and aesthetically pleasing solution.

To achieve this, the pair of spectacles according to the invention additionally comprises the following features:

- the first portion of the side arms comprises a first pair of legs extending in the sliding direction,
- the second portion of the side arms comprises a second pair of legs extending in the sliding direction,
- the first pair of legs and the second pair of legs are mutually engaged.

Thus the legs in the first pair and the legs in the second pair guide each other in their sliding motion while preventing any relative rotational movement.

In another preferable feature of the invention, each side arm additionally comprises a core comprising four wings extending between the pairs of legs and connected to each other at a join line extending along the sliding direction.

Thus the legs can be shortened while improving the precision of the guidance between the first portion and the second portion.

In another feature of the invention, the core preferably extends along the sliding direction and has a cross-section perpendicular to the sliding direction that is in the form of a cross with orthogonal arms.

The guidance between the first portion and the second portion is thus further improved and the risk of jamming and interference with the sliding is reduced.

In another feature of the invention, the core is preferably attached to the first portion.

The simplicity of the implementation is thus increased and adjustment is facilitated.

In a complementary feature of the invention, the second portion is preferably retained in a releasable manner on the core, in the extended position of the side arm.

The use of the pair of spectacles is thus more pleasant and ergonomic.

In another complementary feature, the second portion is preferably retained in a releasable manner on the core when the side arm is in the retracted position.

The use of the pair of spectacles is thus even more pleasant and ergonomic.

In yet another complementary feature of the invention, the core preferably comprises at least one hook suitable for catching on a pin attached to the second portion.

This solution is simple, effective, and robust.

In another feature of the invention, the first portion and second portion are preferably of plastic, and the core is of metal.

This improves the robustness and ease of implementation.

In yet another feature of the invention, the core is preferably concealed between the first portion and the second portion when the side arm is in the retracted position.

This increases the aesthetics.

In another feature of the invention, the first portion and second portion preferably each present an outer surface that is flush with the outer surface of the other when the side arm is in the retracted position.

This further increases the aesthetics.

In another feature of the invention, the retracted position and the extended position preferably constitute two extreme sliding positions along the sliding direction, between which any relative rotational motion between the first portion and the second portion of each side arm is prevented.

Thus the use of the pair of spectacles is simplified and enhances its usability.

In another feature of the invention, the retracted position and the extended position preferably constitute two stable positions, advantageously extreme positions in the sliding direction, where the side arm is able to remain without external action.

In this manner the pair of spectacles offers enhanced usability for multiple users.

BRIEF DESCRIPTION OF THE FIGURES

Other features and advantages of the invention will be apparent from the following detailed description, referring to the attached drawings in which:

FIG. **1** illustrates a partially exploded perspective view of a pair of spectacles of the invention, comprising two side arms,

FIG. **2** is a perspective view of the pair of spectacles from the arrow labeled II in FIG. **1**, with the side arms in the retracted position,

FIG. **3** illustrates the pair of spectacles of FIG. **2** with the side arms in the extended position,

FIG. **4** is a cross-sectional view along the line referenced IV-IV in FIG. **2**, at an enlarged scale,

FIG. **5** is a cross-sectional view along the line referenced V-V in FIG. **1**, with the side arms in a middle pantoscopic adjustment position,

FIG. **6** illustrates the pair of spectacles of FIG. **5**, with the side arms in a first extreme position of pantoscopic adjustment,

FIG. **7** illustrates the pair of spectacles of FIG. **5**, with the side arms in a second extreme position of pantoscopic adjustment.

DETAILED DESCRIPTION

The various figures illustrate a pair of spectacles **1** essentially comprising a viewing portion **2**, a right side arm **10**, and a left side arm **110**, each arm connected to the viewing portion **2** by a hinge **20**, **120** comprising an intermediate element **60**.

The viewing portion **2** extends along the front and supports the lenses (not represented).

The pair of spectacles **1** is symmetrical relative to a mid-plane, with the two side arms **10**, **110** and the two hinges **20**, **120** extending to each side of it. Therefore, unless otherwise stated, in the rest of the description the two side arms **10**, **110** and the two hinges **20**, **120** will be described simultaneously. Elements symmetrical to one another are labeled with numbers differing by **100**.

The side arms **10**, **110** each comprise a front portion **12** and a rear portion **14** each arranged as the extension of the other in a sliding direction X' and able to slide relative to each other, preferably without rotation, in the sliding direction X' between a retracted position illustrated in particular in FIG. **2** and an extended position illustrated in FIG. **3**.

The rear portion **14**, **114** extends in the sliding direction X' between a free back end, intended for placement on the ears of a user, and a front end on which is arranged a pair of rear legs **26**, **28**; **126**, **128** extending in the sliding direction X'.

The front portion **12**, **112** extends in the sliding direction X' between a back end, on which is arranged a pair of front legs **22**, **24**; **122**, **124**, and a front end on which is arranged a tongue **11**, **111**.

The side arms **10**, **110** additionally comprise a core **40**, **140** extending in the sliding direction X'. As illustrated in particular in FIG. **4**, the core **40**, **140** has a cross-section in the form of a cross comprising four orthogonal wings **42**, **44**, **46**, **48**, connected to each other at a join line **50**. Each leg **22**, **24**, **26**, **28** is in close contact with two adjacent wings. There is a recess **22***a*, **22***b*; **24***a*, **24***b*; **26***a*, **26***b*; **28***a*, **28***b* in each of the legs **22**, **24**, **26**, **28** in order to receive the core **40** in a cavity **32** which is enclosed when the side arm **10**, **110** is in the retracted position. Thus the core **40**, **140** is completely hidden inside the side arm **10**, **110** when the arm is in the retracted position, as is illustrated for side arm **110** in FIGS. **1** and **2**.

The core **40**, **140** thus extends between the pair of front legs **22**, **24**; **122**, **124** and the pair of rear legs **26**, **28**; **126**, **128** but also beyond, into the front portion **12** where it is attached to the front portion **12**, **112** of the side arm **10**, **110** by a pin **36**, **136** as well as into the rear portion **14** where it comprises flexible front hooks **52***a*, **52***b* and flexible rear hooks **54***a*, **54***b*.

The retracted position and the extended position constitute two extreme positions along the sliding direction X'. The retracted position and the extended position are two stable positions in which the side arms of the pair of spectacles remain when there is no external action. There can also be a slight friction to prevent undesirable sliding between the front portion **12** and the rear portion **14**. In the embodiment illustrated, as represented in FIG. **2** as a dotted line, when the side arm **10**, **110** is in the retracted position, the front hooks **52***a*, **52***b* releasably catch on the pins **56***a*, **56***b* fixed to the rear portion **14**. The cooperation of the front hooks **52***a*, **52***b* and the pins **56***a*, **56***b* prevents the rear portion **14**, **114** of the side arm **10**, **110** from sliding in the sliding direction X' relative to the core **40**, **140** and to the front portion **12**, **112** of the side arm **10**, **110**. The side arm **10**, **110** is thus releasably retained in the retracted position.

However, as the front hooks **52***a*, **52***b* are flexible, by exerting sufficient force, the user can release the pins **56***a*, **56***b* from the front hooks **52***a*, **52***b* and thus cause the rear portion **14** to slide relative to the front portion **12** of the side arm **10**, **110**.

In a comparable manner, as illustrated in FIG. **3** with dotted lines, when the side arm **10**, **110** is in the extended position, the rear hooks **54***a*, **54***b* releasably grip the pins **56***a*, **56***b*. The cooperation of the rear hooks **54***a*, **54***b* and the pins **56***a*, **56***b* thus releasably maintains the side arm **10**, **110** in the extended position.

Advantageously, the core **40**, **140** is of metal, while the front portion **12**, **112** and the rear portion **14**, **114** of the side arm **10**, **110** are of plastic.

It should also be noted that when the side arm **10**, **110** is in the retracted position, the outer surface **16**, **116** of the front portion **12**, **112** and the outer surface **18**, **118** of the rear portion **14**, **114** of the side arm **10**, **110** are extensions of each other with no discontinuities, the free end of the front legs **22**, **24**; **122**, **124** pressing against the rear portion **14**, **114** in the sliding direction X' and the free end of the rear legs **26**, **28**; **126**, **128** pressing against the front portion **12**, **112** in the sliding direction X'. However, when the side arm **10**, **110** is in the extended position, there are openings between the front legs **22**, **24**; **122**, **124** and the rear portion **14**, **114**, and between the rear legs **26**, **28**; **126**, **128** and the front portion **12**, **112**, revealing the core **40**, **140**.

The length of the front legs **22**, **24**; **122**, **124** and the length of the rear legs **26**, **28**; **126**, **128** in the sliding direction X' preferably corresponds substantially to the distance that the rear portion **14**, **114** slides between its retracted position and its extended position. Thus, when the side arm **10**, **110** is in the extended position, the front legs **22**, **24**; **122**, **124** and the rear legs **26**, **28**; **126**, **128** end substantially at the same level in the sliding direction X'.

The front portion **12**, **112** of the side arm **10**, **110** is assembled to pivot on the intermediate element **60**, about a folding axis Z substantially perpendicular to the sliding direction X', between an unfolded position in which the sliding direction X' is substantially parallel to a longitudinal direction X, as illustrated in particular in FIGS. **1** to **3**, and a folded position in which the side arm **10**, **110** extends substantially along the viewing portion **2**.

To do this, the intermediate element **60** and the front portion **12**, **112** of the side arm **10**, **110** are connected by a pin **30** extending along the folding axis Z. The intermediate element **60** presents two arms **62**, **64**, extending in the longitudinal direction X, forming a slot **66** between them which receives the tongue **11**. The pin **30** is received in attachment holes arranged through the tongue **11** and the arms **62**, **64**.

The intermediate element **60** is received in a housing **4** in the viewing portion **2**. The intermediate element **60** is mounted relative to the viewing portion **2** so that it can pivot about a pantoscopic adjustment axis Y, substantially perpendicular to the longitudinal direction X and to the folding axis Z, between a first extreme position illustrated in FIG. **6** and a second extreme position illustrated in FIG. **7**.

To do this, a pin **58** extending along the pantoscopic adjustment axis Y passes through a main part **72** of the intermediate element **60** and is received in an attachment hole **5** in the viewing portion **2**.

In order to retain the intermediate element **60**, and the side arm **10**, **110** supported by the intermediate element **60**, in a given angular position on the pantoscopic adjustment axis Y relative to the viewing portion **2**, the intermediate element **60** additionally comprises a notched section **68** cooperating with a notched section **8** arranged in the viewing portion **2**, at the back of the housing **4**.

Changing from one angular adjustment position on the pantoscopic axis Y to another is facilitated due to the fact that the notched section **68** is on a flexible portion **70** formed as part of the main portion **72** but thinner, such that the notched section is elastically movable radially to the pantoscopic adjustment axis Y and relative to said main portion **72**.

The notched section **8** of the viewing portion **2** extends between a first extreme tooth **8***a* and a second extreme tooth **8***b* and comprises two teeth more than the notched section **68** of the intermediate element **60**.

Thus when the pantoscopic element **60** is in a middle adjustment position, illustrated in FIG. **5**, the notched section **68** engages with all the teeth of the notched section **8**, except for the two extreme teeth **8***a*, **8***b*.

When the intermediate element **60** is pivoted in a first direction **74** on the pantoscopic adjustment axis Y, the notched section **68** is moved by one tooth relative to the notched section **8**, so that it then engages with the extreme tooth **8***a* of the notched section **8**, as illustrated in FIG. **6**. The main portion **72** of the intermediate element **60** then abuts a lower wall **4***a* of the housing **4**, at a distance from said first extreme tooth **8***a*, which limits the rotation of the intermediate element **60** relative to the viewing portion **2**, about the pantoscopic adjustment axis Y, in the first direction **74**.

Conversely, when the intermediate element **60** is pivoted from the middle adjustment position illustrated in FIG. **5**, in a second direction **76** opposite the first direction **74** and about the pantoscopic adjustment axis Y, the notched section **68** moves by one tooth relative to the notched section **8** and engages with the extreme tooth **8***b* of the notched section **8**, as illustrated in FIG. **7**. The main portion **72** of the intermediate element **60** then abuts an upper wall **4***b* of the housing **4**, at a distance from said first extreme tooth **8***b*, which limits the rotation of the intermediate element **60** relative to the viewing portion **2**, in the second direction **74** about the pantoscopic adjustment axis Y.

Advantageously, the angular offset a between two consecutive teeth of the notched sections **8**, **68**, of the viewing portion **2** and the intermediate element **60** is respectively between 3 degrees and 7 degrees and is preferably substantially equal to 5 degrees.

Lastly, it will be noted that the housing **4** has an opening **6** comprising a frontal portion **6***a* extending substantially perpendicularly to the longitudinal direction X, and a side portion **6***b*, **106***b* extending substantially perpendicularly to the direction of the pantoscopic adjustment axis Y, the frontal portion **6***a* and the side portion **6***b* being adjacent.

The side portions **6***b*, **106***b* are facing one another, in other words they are facing the face of the user. In addition, each of the side portions **6***b*, **106***b* extends next to the slot **66** and corresponds to it in order to receive the tongue **11**, without significant play in the direction of the folding axis Z when the side arm **10**, **110** is folded.

In addition, the side arm **10**, **110** and the viewing portion **2** each present a respective front surface **10***a*, **2***a*; **110***a*, **102***a* having a circular form centered on the pantoscopic adjustment axis Y, arranged close to and adjacent to one another when the side arm **10**, **110** is in the unfolded position. Thus the frontal portion **6***a* of the opening **6** is hidden by the side arm **10**, **110** when said arm is in the unfolded position, as illustrated in particular in FIGS. **5** to **7**.

In addition, the intermediate element **60** is still received in its entirety within the housing **4**, and does not extend beyond the opening **6** and is even recessed within said opening **6**. As a result, the intermediate element **60** is almost invisible.

Of course, the invention is in no way limited to the embodiment just described as a non-limiting example. Thus, although it is not preferred, the housing **4** and the notched section **8** could be arranged in the front portion **12**, **112** of the side arm **10**, **110**, and the tongue **11** could be integrally attached to the viewing portion **2**. The intermediate element **60** would then be reversed back to front.

In addition, although this is not preferred, in an independent or combined manner the arms **62**, **64** and the tongue **11** could be reversed, such that the tongue **11** is integrally attached to the intermediate element **60** and the arms **62**, **64** are integrally attached to the front portion **12**, **112** of the side arm **10**, **110**.

The invention claimed is:

1. Pair of spectacles comprising a viewing portion and two side arms each connected to the viewing portion, each side arm comprising a first portion and a second portion sliding relative to one another in a sliding direction between a retracted position and an extended position, wherein:

the first portion extends in the sliding direction to a back end and comprises a first pair of legs, each projecting in the sliding direction from the back end of the first portion to a free end of the leg,

the second portion extends in the sliding direction to a front end and comprises a second pair of legs, each projecting in the sliding direction from the front end of the second portion to a free end of the leg,

the first pair of legs and the second pair of legs mutually engage such that in the retracted position the free ends of the first pair of legs face the front end of the second portion in the sliding direction, and the free ends of the second pair of legs face the back end of the first portion in the sliding direction.

2. Pair of spectacles according to claim **1**, wherein each arm additionally comprises a core comprising four wings extending between the pairs of legs and connected to each other at a join line extending along the sliding direction.

3. Pair of spectacles according to claim **2**, wherein the core extends along the sliding direction and has a cross-section perpendicular to the sliding direction that is in the form of a cross with orthogonal arms.

4. Pair of spectacles according to claim **2**, wherein the core is attached to the first portion.

5. Pair of spectacles according to claim **4**, wherein the second portion is retained in a releasable manner on the core when the side arm is in the extended position.

6. Pair of spectacles according to claim **4**, wherein the second portion is retained in a releasable manner on the core when the side arm is in the retracted position.

7. Pair of spectacles according to claim **5**, wherein the core comprises at least one hook suitable for catching on a pin attached to the second portion.

8. Pair of spectacles according to claim **2**, wherein the first portion and the second portion are of plastic, and the core is of metal.

9. Pair of spectacles according to claim **2**, wherein the core is concealed between the first portion and the second portion when the side arm is in the retracted position.

10. Pair of spectacles according to claim **1**, wherein the first portion and the second portion each present an outer surface that is flush with the outer surface of the other when the side arm is in the retracted position.

11. Pair of spectacles according to claim **1**, wherein the retracted position and the extended position constitute two extreme sliding positions along the sliding direction, between which any relative rotational motion between the first portion and the second portion of each side arm is prevented.

12. Pair of spectacles according to claim **1**, wherein the retracted position and the extended position constitute two stable positions.

* * * * *